UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/519,650	12/30/2004	Ian D French	14509-0123US1 / P080480AT	2758

26161 7590 06/10/2009

FISH & RICHARDSON PC
P.O. BOX 1022
MINNEAPOLIS, MN 55440-1022

EXAMINER	
GOODWIN, DAVID J	

ART UNIT	PAPER NUMBER
2818	

NOTIFICATION DATE	DELIVERY MODE
06/10/2009	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

PATDOCTC@fr.com

Office Action Summary	Application No.	Applicant(s)	
	10/519,650	FRENCH ET AL.	
	Examiner	Art Unit	
	DAVID GOODWIN	2818	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *21 April 2009*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-4 and 9-14* is/are pending in the application.

4a) Of the above claim(s) *4* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-3 and 9-14* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1 through 3 and 9 through 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nakao (US 5,882,827) in view of Smith (**Attenuated phase shift mask materials for 248 and 193 nm lithography, J. Vac. Sci. Technol. B, vol. 14**, no. **6, p3719-3722**) in view of Kashida (US 5326649).

3. Regarding claim 1.

4. Nakao teaches a mask comprising a mask substrate (1) a half tone mask material (3) arranged in a pattern across the mask substrate (1) and a light-blocking layer (5) arranged in a pattern across the half tone layer (3).

5. Nakao does not teach that the half tone layer comprises silicon nitride.

6. Smith teaches the composition of a half tone mask, in a range of amorphous silicon to stoichiometric silicon nitride, i.e., said composition being a silicon rich silicon nitride, SiN(X) where 0<=X<=1.

7. It would have been obvious to one of ordinary skill in the art to use silicon nitride in order to change the phase of the incident light.

8. Nakao in view of Smith does not teach the thickness or transmissivity of the silicon nitride.

9. It would have been obvious to one of ordinary skill in the art to form a mask layer having a transmission of 20% and a thickness in order to change the phase of the incident light (page 3722, section C) (fig 5).

10. Nakao in view of Smith does not teach that the silicon nitride comprises hydrogen

11. Kashida teaches a silicon nitride layer for use in a mask wherein said silicon nitride layer comprises hydrogen and has a transmission of 70% (column 2 lines 40-50).

12. It would have been obvious to one of ordinary skill in the art to incorporate hydrogen into the layer because this will permit the use of CVD which is a rapid deposition method.

13. The transmissivity of silicon nitride is an inherent property of the material dependent on the chemical composition of the material, the relative concentration of silicon and nitrogen, with an increasing proportion of silicon resulting in a reduced transmission. As the material is known to be used as a mask the transmissivity of the material is also known. "The discovery of a previously unappreciated property of a prior art composition, or of a scientific explanation for the prior art's functioning, does not render the old composition patentably new to the discoverer." *Atlas Powder Co. v. Ireco Inc.*, 190 F.3d 1342, 1347, 51 USPQ2d 1943, 1947 (Fed. Cir. 1999). MPEP 2112.

14. Regarding claim 2.

15. Nakao teaches a mask comprising a mask substrate (1) a half tone mask material (3) arranged in a pattern across the mask substrate (1) and a light-blocking layer (5) arranged in a pattern across the half tone layer (3).

16. Nakao does not teach that the half tone layer comprises silicon nitride.

17. Smith teaches the composition of a half tone mask. Said composition being a silicon rich silicon nitride, in a range of amorphous silicon to stoichiometric silicon nitride.

18. It would have been obvious to one of ordinary skill in the art to use silicon nitride in order to change the phase of the incident light.

19. Nakao in view of Smith does not teach the thickness or transmissivity of the silicon nitride.

20. It would have been obvious to one of ordinary skill in the art to form a mask layer having a transmissivity of 20% and a thickness in order to change the phase of the incident light (page 3722, section C) (fig 5). .

Since the applicant has not established the criticality (see next paragraph) of the concentration or band gap, and this concentration or bandgap has been used in similar devices in the art (see, e.g., Nazawa) it would have been obvious to one of ordinary skill in the art to use these values.

CRITICALITY

The specification contains no disclosure of either the critical nature of the claimed thickness or any unexpected results arising therefrom. Where patentability is said to be based upon particular chosen dimensions or upon another variable recited in a claim, the applicant must show that the chosen dimensions are critical. *In re Woodruff*, 919 F.2d 1575, 1578, 16 USPQ2d 1934, 1936 (Fed. Cir. 1990).

21. Regarding claim 3.

22. Nakao teaches a mask comprising a mask substrate (1) a half tone mask material (3) arranged in a pattern across the mask substrate (1) and a light-blocking layer (5) arranged in a pattern across the half tone layer (3).

23. Nakao does not teach that the half tone layer comprises silicon nitride.

24. Smith teaches the composition of a half tone mask. Said composition being a silicon rich silicon nitride, in a range of amorphous silicon to stoichiometric silicon nitride,

25. It would have been obvious to one of ordinary skill in the art to use silicon nitride in order to change the phase of the incident light.

26. Nakao in view of Smith does not teach the thickness or transmissivity of the silicon nitride.

27. It would have been obvious to one of ordinary skill in the art to form a mask layer having a transmissivity of 20% and a thickness of between 400 and 1000 angstroms in order to change the phase of the incident light (page 3722, section C) (fig 5). .

28. Regarding claim 9.

29. Nakao teaches a mask comprising a mask substrate (1) a half tone mask material (3) arranged in a pattern across the mask substrate (1) and a light-blocking layer (5) arranged in a pattern across the half tone layer (3).

30. Nakao does not teach that the half tone layer comprises silicon nitride.

31. Smith teaches the composition of a half tone mask. Said composition being a silicon rich silicon nitride, in a range of amorphous silicon to stoichiometric silicon nitride,

32. It would have been obvious to one of ordinary skill in the art to use silicon nitride in order to change the phase of the incident light.

33. Nakao in view of Smith does not teach the thickness or transmissivity of the silicon nitride.

34. It would have been obvious to one of ordinary skill in the art to form a mask layer having a transmissivity of 20% and a thickness in order to change the phase of the incident light (page 3722, section C) (fig 5). .

Since the applicant has not established the criticality (see next paragraph) of the concentration or band gap, and this has been used in similar devices in the art (see, e.g., Nakao) it would have been obvious to one of ordinary skill in the art to use these values.

CRITICALITY

The specification contains no disclosure of either the critical nature of the claimed thickness or any unexpected results arising therefrom. Where patentability is said to be based upon particular chosen dimensions or upon another variable recited in a claim, the applicant must show that the chosen dimensions are critical. *In re Woodruff*, 919 F.2d 1575, 1578, 16 USPQ2d 1934, 1936 (Fed. Cir. 1990).

35. Regarding claim 10.

36. Differences in thickness and band gap will not support the patentability of subject matter encompassed by the prior art unless there is evidence indicating such thickness and/or bandgap are critical. "Where the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the workable ranges by routine experimentation". *In re Aller*, 220 F.2d 454,456,105 USPQ 233, 235 (CCPA 1955).

Since the applicant has not established the criticality (see next paragraph) of the thickness or band gap, and this thickness has been used in similar devices in the art (see, e.g., Nakao) it would have been obvious to one of ordinary skill in the art to use these values.

CRITICALITY

The specification contains no disclosure of either the critical nature of the claimed thickness or any unexpected results arising therefrom. Where patentability is said to be based upon particular chosen dimensions or upon another variable recited in a claim, the applicant must show that the chosen dimensions are critical. *In re Woodruff*, 919 F.2d 1575, 1578, 16 USPQ2d 1934, 1936 (Fed. Cir. 1990).

37. Regarding claim 11.

38. Nakao in view of Smith teaches elements of the claimed invention above.

39. Nakao in view of Smith do not teach a transmittance in the range of 40-80%.

40. Kashida teaches a transmission of 70%

41. It would have been obvious to one of ordinary skill in the art to select the parameters of a mask to provide a transmittance of 65% in order to be sufficient for mask inspection.

42. Further, differences in transmittance will not support the patentability of subject matter encompassed by the prior art unless there is evidence indicating such transmittance are critical. "Where the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the workable ranges by routine experimentation". *In re Aller*, 220 F.2d 454,456,105 USPQ 233, 235 (CCPA 1955).

Since the applicant has not established the criticality (see next paragraph) of the transmittance, and this transmittance has been used in similar devices in the art (see, e.g., Nazawa) it would have been obvious to one of ordinary skill in the art to use these values.

CRITICALITY

The specification contains no disclosure of either the critical nature of the claimed thickness or any unexpected results arising therefrom. Where patentability is said to be based upon particular chosen dimensions or upon another variable recited in a claim, the applicant must show that the chosen dimensions are critical. *In re Woodruff*, 919 F.2d 1575, 1578, 16 USPQ2d 1934, 1936 (Fed. Cir. 1990).
43.

44. Regarding claim 12

45. It would have been obvious to optimize the performance of the mask by making the mask as flat as possible. It has been held that where the general conditions of a claim are disclosed in

prior art, discovering the optimum or working ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233.

46. Regarding claim 13.

47. The transmissivity of silicon nitride is an inherent property of the material dependent on the chemical composition of the material, the relative concentration of silicon and nitrogen, with an increasing proportion of silicon resulting in a reduced transmission. As the material is known to be used as a mask the transmissivity of the material is also known. "The discovery of a previously unappreciated property of a prior art composition, or of a scientific explanation for the prior art's functioning, does not render the old composition patentably new to the discoverer." *Atlas Powder Co. v. Ireco Inc.*, 190 F.3d 1342, 1347, 51 USPQ2d 1943, 1947 (Fed. Cir. 1999). MPEP 2112.

48. Regarding claim 14.

49. The transmissivity of silicon nitride is an inherent property of the material dependent on the chemical composition of the material, the relative concentration of silicon and nitrogen, with an increasing proportion of silicon resulting in a reduced transmission. As the material is known to be used as a mask the transmissivity of the material is also known. "The discovery of a previously unappreciated property of a prior art composition, or of a scientific explanation for the prior art's functioning, does not render the old composition patentably new to the discoverer." *Atlas Powder Co. v. Ireco Inc.*, 190 F.3d 1342, 1347, 51 USPQ2d 1943, 1947 (Fed. Cir. 1999). MPEP 2112.

50.

Response to Arguments

51. Applicant's arguments with respect to claims 1 through 3 and 9 through 12 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to DAVID GOODWIN whose telephone number is (571)272-8451. The examiner can normally be reached on Monday through Friday, 9:00am through 5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Steven Loke can be reached on (571)272-1657. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

djg

/Steven Loke/

Supervisory Patent Examiner, Art Unit 2818